This is a CONTROLLED DOCUMENT **EG&G - ROCKY FLATS PLANT ENVIRONMENTAL MANAGEMENT**

THEOCHY PLANT **EMD OPERATING** PROCEDURES MANUAL

Manual No.: Procedure No.:

5-21000-OPS-SW Table of Contents, Rev 7

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Effective Date.

09/30/92

Organization:

Environmental Management

THIS IS ONE VOLUME OF A SIX VOLUME SET WHICH INCLUDES:

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ENVIRONMENTAL MANAGEMENT DYE TESTING BUILDING DRAINS This is a RED Stamp DYE EG&G ROCKY FLATS PLANT Manual Number: **EM OPERATIONS**

Procedure No:

5-21000-OPS SW.29, Rev 0

PROCEDURES MANUAL

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CATEGORY 2

Organization:

SWD

TITLE:

DYE TESTING **BUILDING DRAINS** Approved By:

9 129192

Manager, Surface Water Division

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1. PURPOSE

The purpose of this procedure is to provide instructions for Dye Testing building drains at the Rocky Flats Plant (RFP) to ensure that unacceptable amounts of hazardous or otherwise inappropriate substances at Rocky Flats Plant (RFP) cannot inadvertently enter the Sanitary Sewer (SS) system.

2. SCOPE

This procedure implements Dye Testing and documentation of any drain at RFP to ensure the drain's integrity or to determine the drains true disposition.

This procedure addresses the visual detection of dye at selected manholes, the Diversion Boxes and at Process Waste sampling locations when appropriate.

3. REFERENCES

3.1 Primary References

- 3.1.1 Dye Testing Health and Safety Plan
- 3.1.2 RFP Engineering Document Control Facilities Engineering Drawings
- 3.1.3 RFP Standard SX-164
- 3.1.4 RFP Training Users Manual 1-10000-TUM
- 3.1.5 RFP LO/TO Procedure (Health & Safety Practices, Section 2.08)
- 3.1.6 RFP EM/SWD 3-21000-ADM-17.01, QA Records Management.

3.2 <u>Secondary References</u>

- 3.2.1 NPDES FFCA Chromic Acid Incident plan
- 3.2.2 DEPARTMENT OF ENERGY (DOE) ORDERS:

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- a. DOE Order 5480.4 Environmental Protection, Safety and Health Protection Standards
- b. DOE Order 6430.1A General Design Criteria
 - Section 1300-8 Special Facilities Waste Management
 - Section 1300-9 Special Facilities Effluent Control and Monitoring
 - Section 1323-5 Special Facilities Radioactive Liquid Waste Facilities
- 3.2.3 ENVIRONMENTAL PROTECTION AGENCY (EPA) REGULATIONS:
 - a. 40 CFR 122 National Pollution Discharge Elimination System Permit Regulations
 - b. 40 CFR 131 Procedures for Approving State Water Quality Standards
- 3.2.4 COLORADO WATER QUALITY CONTROL ACT:
 - a. CRS 35-8 Colorado Water Quality Control Act
 - b. 5 CCR 1002 Regulations for the State discharge Permit System
- 3.2.5 Conduct of Engineering Manual Section 6.7
- 3.2.6 Conduct of Engineering Manual DES-19
- 3.2.7 Conduct of Engineering Manual DES-68A

4. LIMITATIONS AND PRECAUTIONS

4.1 Personnel in the vicinity of an open manhole or 990 Diversion Boxes shall consider the potential hazards (e.g., confined space entries, rising water, falls) and not put themselves or others at undue risk.

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5. PREREQUISITES

- 5.1 Personnel shall read and understand the Dye Testing Health and Safety plan.
- 5.2 Personnel shall be current on all training required, per the Training Users Manual, 1-10000-TUM, to perform the tasks described in this procedure.
- 5.3 Personnel shall be aware of and perform all requirements (i.e., Work Permits, Plan of the Day, appropriate notification, etc.) prior to entering a building or area.

6. INSTRUCTIONS

6.1 Preparation

- 6.1.1 Obtain copies of Engineering Reference Drawings (Floor Plans, Site Utilities Plans, Plumbing, Process Waste & Sanitary Sewer drawings) from Engineering Document Control (building 130), the building representative, or other sources.
- 6.1.2 Obtain access to copies of the SWD approved "Baseline" time for the building (if established).
- 6.1.3 Using the copies of the Reference Drawings, determine the location of the drain(s) to be dye tested, the location of the exit point of the Sanıtary Sewer Main from the building, and a known SS drain (Toilet, etc.) furthest from that exit point.
- 6.1.4 Using the Sight Utilities Plan and the Manhole Location Map (Appendix 10), identify the down gradient sanitary manhole (if any), associated with the building being dye tested, and/or verify the location in the field.
- 6.1.5 Field walk down the area to verify determinations.

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- 6.1.6 Obtain the Dye Test Ready Review Sheet (Appendix 4) from RFP Forms Control, and complete the tasks on the form including the appropriate notifications.
- 6.1.7 Complete the Dye Test Ready Review Sheet (Appendix 3) including the appropriate notifications.
- 6.1.8 Obtain Dye Test Log Sheet (Appendix 2) and Dye Sighting (DS) Log Sheet (Appendix 3) forms from RFP Forms Control.
- 6.1.9 Arrange for a Process Waste representative to sample the PW waters at an appropriate Sampling Port, (if a port exists on that system) when Dye Testing Unlabeled or Questionable drains.
- 6.1.10 Obtain materials listed in Appendix 5.
- 6.1.11 Take appropriate actions to gain access to the building to be dye tested and the dye sighting areas.
- 6.1.12 Establish a source of water and the most reasonable method of transportation (e.g., hose, bucket, etc) available to transport water to the dye injection sites.
- 6.1.13 Station Dye Spotters at the Sanitary Sewer down gradient manhole and/or at the 990 Diversion Box to visually inspect the sanitary waste water for color changes indicating the presence of dye.
- 6.1.14 If an SWD approved "Baseline" time does not exist, then establish a "Baseline" time for the building as instructed in Section 6.2.

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6.2 Establish a "Baseline" Time

- 6.2.1 Using information gathered in Section 6.1.1, locate a known SS drain (Toilet, sink, etc.) furthest from the main drain lines exit point from the building.
- 6.2.2 Mix one tablespoon of FD&C red dye 40 with 5 gallons of water until all granules have dissolved (Dye Concentrate).
- 6.2.3 Inject dye into drain(s) as follows:
 - 6.2.3.1 For toilets
 - a. Dispense 1 tablespoon of FD&C red dye 40 into the toilet(s).
 - b. Flush toilet at least 5 times ensuring that all dry granules are flushed into and down the drain with the water.
 - 6.2.3.2 For building drains (sinks, floor drains, etc.)
 - a. Pour 1 to 2 pints of concentrate into a drain.
 - b. Flush with a minimum of 20 gallons of water.
- 6.2.4 Document the time of dye injection on the Dye Test Log Sheet and alert the Dye Spotters, by radio, to start watching for dye traces at the Dye Sighting locations (See Section 6.5).
- 6.2.5 After receiving notification from the Dye Spotter(s) that dye has been detected, document the time(s) and location(s) on the Dye Test Log Sheet.
- 6.2.6 Note the total time it took for dye to reach each location on the Dye Test Log Sheet under comments.

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NOTE

This duration becomes the suggested "baseline" for flow to go from the building to the SS dye spotting locations. The baseline is only a guideline. Experienced judgement shall be required in making determinations based on this factor.

6.2.7 Allow at least twice the "baseline" time to pass before injecting dye into the next drain, or series of drains.

6.3 Dye Testing Labeled Process Waste Drain

- 6.3.1 Establish a "Baseline" time for the building as instructed in Section 6.2 or use an SWD approved previously established "Baseline" time.
- 6.3.2 Mix one tablespoon of FD&C red dye 40 with 5 gallons of water until all granules have dissolved (Dye Concentrate) as needed.
- 6.3.3 Inject dye into one or more PW drains, as directed in Section 6.2.3.
- 6.3.4 Document the time of dye injection on the Dye Test Log Sheet and alert the Dye Spotters, by radio, to start watching for dye traces at the Dye Sighting locations (See Section 6.5).
- 6.3.5 After receiving notification from the Dye Spotter(s) that dye has been detected, document the time(s) and location(s) on the Dye Test Log Sheet.
 - a. If no dye is detected at the SS Dye Spotting locations within the "baseline" time then document the disposition of each drain on the Dye Test Log Sheet as PW.
 - b. If dye does appear at a Sanitary Sewer location, one or more of the labeled Process drains are mislabeled. Drains must be re-dye tested, one at a time, until all improperly labeled drains are detected.

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NOTE

After injecting dye into the final labeled Process Waste drain in a building, allow the dye at least twice the "baseline" time to reach one of the officially designated dye sighting location(s) before Dye Testing an Unlabeled drain or before Dye Testing in another building.

6.3.6 Sign all Dye Test Log Sheets, at the end of each day, then deliver them to the EM/SWD DIS Master Log Book representative.

6.4 Dye Testing Unlabeled or Questionable Drains

- 6.4.1 Establish a "Baseline" time for the building as instructed in Section 6.2 or use an SWD approved previously established "Baseline" time.
- 6.4.2 Station a Process Waste representative at the appropriate PW sampling port. This would be in conjunction with the SS Dye Spotting locations set up when the "baseline" time was established and inject dye (as instructed in Step?) into one or more Unlabeled or Questionable drains.

NOTE

If a PW representative could not be stationed at a sampling port, then Questionable drains must be dye tested one at a time. If a PW representative is located at a PW location and dye is detected at both SS and PW Dye Sighting locations, then drains must be retested one at a time.

- 6.4.3 Mix one tablespoon of FD&C red dye 40 with 5 gallons of water until all granules have dissolved (Dye Concentrate) as needed.
- 6.4.4 Inject dye into one Unlabeled or Questionable drains at a time, as directed in Section 6.2.3.
- 6.4.5 Document the time of dye injection on the Dye Test Log Sheet and alert the Dye Spotters, by radio, to start watching for dye traces at the Dye Sighting locations (See Section 6.5).

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- 6.4.6 Document the time and location of any dye sightings on the Dye Test Log Sheet after receiving notification from Dye Spotter(s).
 - a. If dye is detected at any of the SS Dye Spotting locations then document the disposition of that drain on the Dye Test Log Sheet as SS.
 - b. If dye is detected at the PW Dye Sampling location(s) then document the disposition of that drain on the Dye Test Log Sheet as PW.
 - c. If dye does not appear at any Dye Spotting or Dye Sampling location then, the drain must be treated as SS until verified and approved evidence can be presented to the contrary.
- 6.4.7 Allow the "baseline" time to pass before injecting dye into the next drain.

NOTE

After injecting dye into the final Unlabeled drain in a building allow at least twice the "baseline" time for the dye to reach one of the official dye sighting locations before Dye Testing any Process Waste drains or before Dye Testing in another building discharging to the same Sanitary Sewer manhole or Process Waste System.

6.4.8 Sign all Dye Test Log Sheets, at the end of each day.

6.5 Dye Sighting

NOTE

The Dye Injector shall send notification, by radio, to all Dye Spotters at the time the dye is injected. If a color, other than red, should appear at the Sanitary Sewer while dye testing a drain or a series of drains, then all discharging to the SS system is to be discontinued for two (2) hours and that drain is to be re-dye tested or, the drain is to be treated as Sanitary Sewer.

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6.5.1 Process Waste Locations

NOTE

All Process Waste Dye Spotters (Samplers) and Sampling Port Locations (e.g., a pit, a sump, etc.) shall be specified by Liquid Waste Operations Management.

- 6.5.1.1 Draw water from the Sampling Valve and visually inspect for color prior to dye injection.
- 6.5.1.2 Close the main valve entering the appropriate Process Waste tank immediately upon receiving notification that the dye has been injected into a drain.
- 6.5.1.3 Draw water from the Sampling Valve 10 minutes after the dye injection; compare the color to the previous sample; and visually inspect for dye; open valve.
- 6.5.1.4 Notify the Dye Injector by radio of visual color changes.
- 6.5.1.5 Document the date, time and location of each sample taken, on a DS Log Sheet.
- 6.5.1.6 Repeat Sections 6.5.1.1 through 6.5.1.5 for each dye injection.
- 6.5.1.7 Sign all DS Log Sheets, at the end of each day.

6.5.2 Manholes

Read and understand the Dye Test H&S Plan.

NOTE

The Dye Injector shall send notification, by radio, at the time dye has been introduced into the system.

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WARNING

DO NOT ENTER THE MANHOLE AND USE EXTREME CAUTION WHEN REMOVING THE MANHOLE COVER!

- 6.5.2.1 Remove the cover on each manhole and test for gasses, following the Health & Safety Plan.
- 6.5.2.2 Stand <u>above</u> the manhole and lower the "Backdrop Extension" (See Appendix 4) down into the manhole. Shine a high intensity light down on it after receiving notification that dye has been injected into the system.
- 6.5.2.3 Watch for any dye traces in the water crossing over the backdrop.
- 6.5.2.4 Notify the Dye Injector and the spotter at the Diversion Box by radio immediately upon sighting dye.
- 6.5.2.5 Document the date, time and location of each sighting on a DS Log Sheet.
- 6.5.2.6 Repeat Sections 6.5.2.2 through 6.5.2.5 for each required dye sighting at that location.
- 6.5.2.7 Sign all DS Log Sheets, at the end of each day.

6.5.3 990 Diversion Box

NOTE

The Dye Injector shall send notification, by radio, at the time dye has been introduced into the system.

WARNING

DO NOT ENTER THE MANHOLE AND USE EXTREME CAUTION WHEN REMOVING THE GRILLE ON THE DIVERSION BOX!

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- 6.5.3.1 Stand <u>above</u> the Diversion Box on the fall side.
- 6.5.3.2 Lower the "Backdrop Extension" (See appendix 4) down into the Diversion Box and shine a high intensity light down on the backdrop plate and watch for dye to appear in the stream of water crossing over it upon receiving notification from the Dye Injector that dye has been introduced into the system.
- 6.5.3.3 Notify the Dye Injector by radio immediately upon sighting dye.

NOTE

The Dye Spotter at the manhole upstream from the Diversion Box shall send notification, by radio, if dye is spotted at that location first.

- 6.5.3.4 Document the date, time and location of each sighting, on the DS Log Sheet.
- 6.5.3.5 Repeat Sections 6.5.3.1 through 6.5.3.4 for each required dye sighting at that location.
- 6.5.3.6 Sign all DS Log Sheets, at the end of each day.

6.6 Review Documents

- 6.6.1 Review the Dye Test and DS Log Sheets for consistency and completeness.
- 6.6.2 Revise or reconstruct the Dye Test and Dye Sighting Log Sheets for consistency and neatness.

6.7 Finalize Documents

6.7.1 Sign and date all Dye Test and DS Log Sheets.

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6.7.2 Send log sheets to RFP EMD Records Center to be filed under the appropriate section of the DIS Master Log Book.

7. RECORDS

The log sheets are quality records and the originals shall be submitted to the EMD Records Center per 3-21000-ADM-17.01, Quality Records Management, for inclusion in the DIS Master Log Book.

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APPENDIX 1 Dye Test Log Sheet

BUILDING #____

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* This known sanitary drain was tested to establish the time required for the tracer dye to enter the diversion box at building 990.

| DYE TESTED BY | | WITNESSED BY- | |
|---------------|-------|---------------|-------|
| Signed | Dated | Signed | Dated |

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APPENDIX 2 Dye Sighting (DS) Log Sheet

DYE SIGHTING LOG SHEET (DS)

| Date | | - |
|------------------|---------------------|--------------|
| Location _ | | |
| Dye Sporte | r | |
| | | print name) |
| TIME NOTIFIED | TIME OF SIGUTING | COMMENTS |
| | | |
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(signature)

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APPENDIX 3 Dye Test Ready Review Sheet and Contact List

DYE TEST READY REVIEW SHEET

BUILDING*

SECURITY CLEARANCE REQUIRED

TRAINING REQUIREMENTS COMPLETE

ON PLAN OF THE DAY

WORK PERMIT

BUILDING*

YES NO

NOT REQ

NO NOT REQ

CONTACT LIST

Contact each group or individual giving them:

24 Hours Notice & 1 Hour Notice

| | EXT | PAGE | DATE |
|---|-------|-------|------|
| BUILDING OPERATIONS MANAGER | x | D | |
| BUILDING H&S AREA ENGINEER | x | D | |
| BUILDING LO/TO MANAGER | xx | D | |
| PLANT PROTECTION | X2464 | | |
| WALKIE-TALKIE (to get walkie-talkies) | X6429 | | |
| RCRA/CERCLA - ALLEN SHUBERT | X5251 | D1177 | |
| WASTE WATER TREATMENT PLANT (WWTP) - FRANK HUFFMAN | X4502 | D3112 | |
| WASTE OPERATIONS MANAGER - BOB MORGAN | X6013 | D1855 | |
| SURFACE WATER DIVISION (SWD) - BOB FIEHWEG | x8542 | D3132 | |

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APPENDIX 4
Work Materials List

WORK MATERIALS

Prior to Dye Testing, the following items must be obtained:

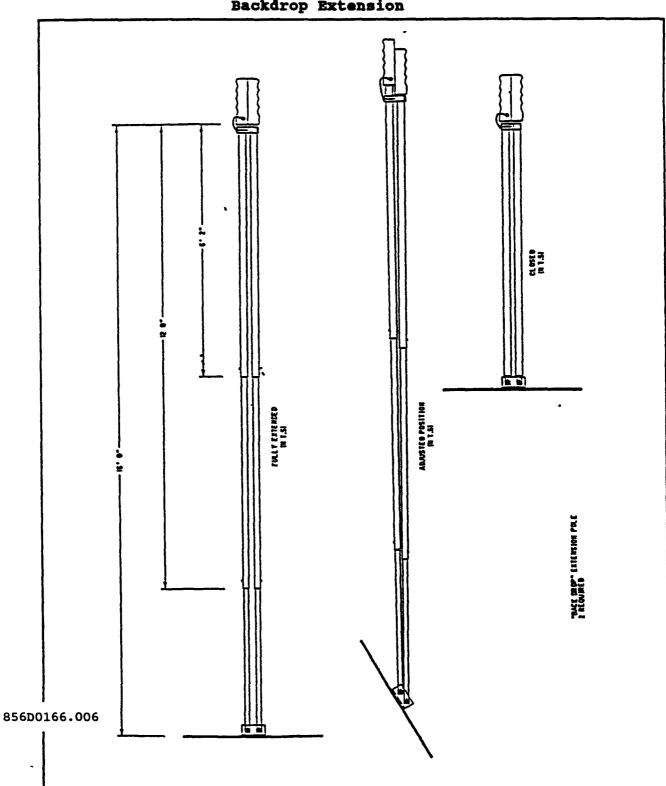
- Dye Test Ready Review Sheet and Contact List
- Engineering Sewer Drawings (copies)
- Drain Location Sketch(s) (copies)
- FD&C Red #40 dye and a one tablespoon measuring devise.
- Water supply must be located
- 5 gallon bucket
- 1 gallon container
- Ready made drain covers
- Four Radios set at the same frequency and approved by Security
- High-power flashlight
- Dye Test Log Sheets
- Dye Sighting (DS) Log Sheets
- Writing Surface (Clipboard)
- Writing Instruments
- Protective Clothing (Coveralls, latex gloves, etc.)
- HNu or OVA Meter
- LEL/O, Meter
- Backdrop Extension (may be checked out from Surface Water Division of Environmental Management)

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Backdrop Extension



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APPENDIX 6

Tracer Dye Material Safety Data Sheet (MSDS) and Engineering Letter of Approval

ROBERT KOCH INDUSTRIES INC.

ROUTE 1 BOX 4HH BENNETT CO 80102 (303) 544-3753

MATERIAL SAFETY DATA SHEET

| PRODUCT NAME FD&C RE | d #40 Color Inde | ex no: 16035 | | |
|--|-----------------------|---|-----------------|--|
| CHEMICAL NATURE FOO | d Red 17 | | | |
| 90 - 93 | X | | | |
| | - 1. PHYSICAL | DATA - | | |
| BOILING POINT, 760 mm Hg | N/A | FREEZE POINT N/A | | |
| SAECILIC CYYALIA | N/A | →APCR PRESSURE AT 2000 | N/A | |
| VAPOR CENSITY | N/A | Something in 850 | Approx 25% | |
| PER CENT VOLATILES BY WELGHT | N/A | IONIC NATURE | N/A | |
| APPEARANCE AND COOR | Red Granuiar - | Didos pape | | |
| | - 2. HAZARDOUS I | | | |
| | MATERIAL | • | TZV (Unics) | |
| FD&C colors are n | ot hazardous material | - so not fall unde | the | |
| jurisdiction of D | .0.T. | | | |
| | | <u>}</u> | | |
| | | 1 | | |
| | - 3, FIRE AND EXPLOS | SION HAZARD DATA - | | |
| FLASH POINT (test method | 1 | SION HAZARD DATA - AUTOIGNITION TEMPERATURE | N/A | |
| FLASH POINT (test method FLAMMARII LIMITS IN AIR. | N/A | AUTOIGNITION TEMPERATURE | N/A PPER N/A | |
| | N/A | AUTOIGNITION TEMPERATURE | | |
| PLANNABLE LIMITS IN AIR. | N/A by volume | LOWER N/A U | | |

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| | - 4. HEALTH HAZARD DATA - |
|--|---|
| THRESHOLD LIMIT VALUE | None |
| EFFECTS OF CVEREXPOSURE | No effects. |
| EMERGENCY AND FIRST AID PROCIDURES | N/A |
| | - 5. REACTIVITY DATA - |
| STABILITY | |
| | CONDITIONS |
| XXX | TO AVOID |
| | |
| INCOMPATIBILITY (materials to avoid) | Bleach Products |
| HAZARDOUS DECOMPOSITION PRODUCTS | None |
| | , monte |
| HAZARDOUS | CONDITION |
| POLYMERIZATION | |
| May Occur: Will not | OCCUT TO AVOID |
| · XXX | |
| | |
| | - 6. SPILL OR LEEK PROCEDURES - |
| | |
| STEPS TO BE TAKEN IF | Will not burn - suggest sanitary landfill in accordance |
| MATERIAL IS RELEASED | • |
| OR SPILLED | with local, state, and federal regulations |
| WASTE DISPOSAL METHOD | See above |
| | - 7. SPECIAL PROTECTION INFORMATION - |
| | - / SPECIAL PROTECTION INFORMATION - |
| RESPIRATORY PROTECTION (Specify Type) | This product tends to be dusty. Ventilation or dust mask would be helpful, but not necessary |
| WENTER TO LOCAL EXHAUST | |
| VENTILATION LOCAL EXHAUST | I CTER I |
| PROTECTIVE GLOVES | Rubber EYE |
| CTHER PROTECTIVE EQUIPMENT | Color stains are aggravating but not hazardous. Any protection from dust is generally appreciated |
| | - 8. SPECIAL PRECAUTIONS - |
| PRECAUTIONARY LABELING | None |
| OTHER HANDLING AND STORAGE CONTITIONS | Keep in closed containers. |

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Internal Letter



September 20, 1989

No

8.79

TO

FROM

D. W. Walker

Those Listed

Plant Utilities Eng. Building 130 5450 (dig pager 320)

SUBJECT TRACER DYE INJECTION IN BUILDING DRAIN SYSTEMS

Under current project Authorization No. 492249 - Drains Identification Study, Facilities Engineering personnel will be injecting tracer dye into the process drains in the buildings which are connected or suspected to be connected to the process waste lines. This tracer dye test will provide a positive identification of the drain connections and will identify if there are cross connections between the process waste line(s) and the sanitary waste line(s).

The test will be conducted using an Industrial Hygiene recommended FD&C Red 40 dye. The Material Safety Data Sheet (MSDS) for this dye is on file in the Industrial Hygiene office and is attached. The dye is a dark red dye used for food, drug and cosmetic which is not a hazardous material and has no known significant harmful environmental effect. The dye will be mixed in water to produce a dark red solution Approximately 1 - 2 gallons of this solution will be injected into the process drain followed by approximately 2 - 3 gallons of clear water. Facilities Engineering personnel will be observing the outcome of the drain lines at various locations in the building drain system. No sealed drains in areas containing radioactive or other hazardous materials will be opened.

The tracer dye test will be conducted for all buildings on plant site which have process drains. The test is tentatively scheduled to begin on September 25, 1989, and will continue through May 1990. Facilities Engineering will notify the Building Manager, Plant Protection, HS&E Area Engineer, Sewage Treatment Plant, Utility Area Manager, and RCRA/CERCLA Office of the date and building of the test 24 hours prior to the beginning of each test. In addition, Facilities Engineering will verbally notify the above offices 1 hour prior to actual dye injection

If you have any questions or comments, please feel free to contact me at extension 5450 or digital pager 320.

D W Walker, Project Engineer Plant Utilities Engineering

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TRACER DYE INJECTION TEST

APPROVED

Facilities Engineering

APPROVED:

RCRA/CERCLA

Marshall Plant Services APPROVED:

Plant Security

APPROVED

APPROVED

R. Narmon Waste Operations APPROVED:

Utilities

APPROVED

Nuclear/Industrial Safety

APPROVED:

R. E. Richardella HS&E Engineering

Distribution

- C. E. Beutler
- M G. Colalancia
- G. W. Coles
- Eden
- D. W. Ferrera J. P. Koffer
- J. R. Marshall
- McCarthy
- K. B. McKinley
- E. R. Narmon
- R. E. Richardella
- Terkun 49
- E R Young

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APPENDIX 7

